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HIV-related Stigma and Health among People Living with HIV in Middle Georgia:
Examining the Roles of Stress and Coping

Kaylee E. Burnham, Ph.D.

University of Connecticut, 2017

Objective – HIV-related stigma and discrimination are drivers of health disparities among people living with HIV (PLWH). The U.S. South bears much of the burden of the domestic HIV epidemic. This study seeks to explore the dynamic effects of HIV-related stigma on health outcomes in a population of PLWH in middle Georgia. Experiences of enacted HIV stigma in the past year were assessed and participants indicated how stressful these events were and how they coped with the most impactful event. The primary study aim tested a moderated serial mediation model of HIV stigma on health in this population.

Method – A total of 199 people living with HIV completed surveys via audio computer-assisted self-interviews (ACASI) while they attended their regular clinic appointment at a Ryan White clinic located in Macon, GA. Measures included demographics, health information, experiences of enacted stigma in the past year, stress and coping with the most impactful enacted stigma event. Medical information (viral load, CD4 count, clinic attendance, and medications) was abstracted from patient charts for a period of 6 months prior to their survey date.

Results – A total of 96 individuals endorsed experiencing enacted stigma in the past year, and the sample endorsed moderate levels of internalized HIV stigma. Individuals who endorsed enacted stigma tended to have more negative psychosocial and mental health outcomes. Internalized stigma related to stress indexed on the most salient event

of enacted stigma in the past year as well as maladaptive coping strategies used to cope with discriminatory experiences. There was not evidence in multivariate analyses that stress or maladaptive coping mediated effects of internalized stigma on medication adherence. There was also not a moderating effect of adaptive coping strategies on medication adherence in this sample.

Conclusion – HIV stigma appears to have short-term effects on mental health, which could lead to long-term effects on physical health. Longitudinal investigations are indicated to uncover the mediating and attenuating mechanisms of HIV stigma on health. Stigma should be addressed in the context of health promotion interventions for PLWH given its implications on mental health and wellbeing.

HIV-related Stigma and Health
among People Living with HIV in Middle Georgia:
Examining the Roles of Stress and Coping

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2017

APPROVAL PAGE

Doctor of Philosophy Dissertation

HIV-related Stigma and Health
among People Living with HIV in Middle Georgia:
Examining the Roles of Stress and Coping

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HIV-related Stigma and Health among People Living with HIV in Middle Georgia: Examining the Roles of Stress and Coping

Addressing health disparities faced by individuals living with human immunodeficiency virus (HIV), including HIV-related stigma is a public health priority. HIV stigma – defined as the social devaluation and discrediting of people living with HIV (PLWH) – is a significant barrier to improving the health and wellbeing of PLWH (Link & Phelan, 2001; Mahajan, et al., 2008; Hatzenbuehler, Phelan, and Link, 2013). Stigma produces limitations across all levels of prevention and management of HIV. Consequences of HIV stigma include reduced uptake of HIV-related information and testing, lower linkage and retention in HIV care, lower treatment adherence, accelerated HIV disease progression, poorer mental health, lower likelihood of HIV status disclosure, and rejection and isolation from family, friends, and community supports (Fife & Wright, 2000; Herek, Capitanio, & Widaman, 2003; Vanable, Carey, Blair, & Littlewood, 2006; Logie & Gadalla, 2009; Katz, et al., 2013; Earnshaw, Smith, Chaudoir, Amico, & Copenhaver, 2013). Stigma functions as a chronic stressor in the lives of those who are stigmatized, serving as a mechanism that undermines health and drives health inequalities (Phelan, Link, & Tehranifar, 2010). Recently, the National AIDS Strategy (2015) called for the reduction of HIV stigma as a means to improve health among PLWH:

“The United States will become a place where new HIV infections are rare, and when they do occur, every person, regardless of age, gender, race/ethnicity, sexual orientation, gender identity or socio-economic circumstance, will have unfettered access to high quality, life-extending care, *free from stigma and discrimination.*” (White House Office of National AIDS Policy, 2015, p.3)

However, stigma has proven difficult to reduce and eliminate at the societal and structural level. Theoretical and meta analytic work suggests the importance of understanding the dynamic effects of HIV stigma on individuals, and finding avenues to protect people from the harmful impact of stigma (e.g., Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2015; Earnshaw, Bogart, Dovidio, & Williams, 2013; Logie & Gadalla, 2009).

Defining Stigma and Its Mechanisms

Early research on HIV stigma was built on Erving Goffman's (1963) conceptualization of stigma that characterized people with an "attribute that is deeply discrediting" (p.3). Note that Goffman's writing was published well before the onset of the HIV epidemic in the 1980's, and he focused his conceptualization on those with a visible "identity," which allowed observers to link the attribute to stereotypes (Jones, et al., 1984). Stigma is a complex phenomenon and there remains some variation in how it is defined and conceptualized. To the preceding definition, Link and Phelan (2001) added important components of stigma: that it leads to a degree of separation between "us" (the stigmatizers) and "them" (the stigmatized), and that identification of a stigmatized trait leads to status loss and adverse outcomes. Discrimination, prejudice, and stereotyping encompass behavioral, affective, and cognitive responses that occur as a result of a more global stigma process (Deacon, 2006). Applied to the HIV epidemic, this process likely occurs as a means for people to distance themselves from risk of infection by blaming and marginalizing other groups for contracting and spreading the disease (e.g., people who engage in risky sexual behaviors, sex workers, gay and bisexual men, transgender individuals, IV drug users, people living in poverty,

racial minorities, women). Moreover, this process of stigmatization and discrimination occur in the context of a structure of social and economic power (Link & Phelan, 2001; Mahajan, et al., 2008). From a sociological perspective, “stigma and stigmatization function – quite literally – at the intersection of *culture, power, and difference*” (Parker & Aggleton, 2003, p.17). As such, HIV stigma often occurs in tandem with other socially devalued characteristics (e.g., socioeconomic status, race, gender, sexual orientation; Parker & Aggleton, 2003). These aforementioned perspectives offer context to the problem of HIV stigma as a social process, but additional work is needed to understand how stigma impacts individuals.

Earnshaw and Chaudoir (2009) synthesized the literature on stigma’s impact on individuals by reviewing HIV stigma measures. They found three distinct mechanisms of HIV-related stigma conceptualized in their model, the HIV Stigma Framework. *Enacted stigma* (also referred to as perceived stigma) is the prejudice and discrimination from others that are experienced by PLWH. *Anticipated stigma* describes expectations that PLWH have that they will be discriminated against because of their HIV status. *Internalized stigma* (also referred to as self stigma) refers to the extent to which PLWH apply negative beliefs and feelings about HIV/AIDS to themselves. Since their review, Earnshaw and colleagues (2013) hypothesized and tested potential relationships between the HIV stigma mechanisms and health outcomes. For instance, enacted stigma demonstrates greater association with physical health outcomes (e.g., CD4 cell count). Anticipated stigma is associated with adverse behavioral outcomes such as lower engagement in medical care. Internalized stigma is associated with negative emotional states (e.g., helplessness). In their review, Earnshaw and Chaudoir (2009)

pointed to the importance of building an understanding of who is affected by HIV stigma, how they are affected, and what the outcomes of HIV stigma mechanisms are at the individual level as a way to study this complex construct moving forward.

Stigma and Health

As the concept of stigma has evolved, researchers are increasingly interested in explaining and quantifying its impact on health. A major body of work in this field has introduced and investigated the minority stress model. This model implies causal relationships between sexual minority group status, increased stress, limited coping resources, and adverse health outcomes, including HIV risk (Meyer, 1995). A separate literature has investigated the implications racism and race-related discrimination on health (e.g., Brondolo, Brady, Pencille, Beatty, & Contrada, 2009). Moreover, stigma has become a focus in the area of HIV behavioral research (Earnshaw, et al., 2013; Rueda, et al., 2016). Despite these relatively separate tracks of research, they share commonalities in that the models define stigma and discrimination as stressors in the lives of those who experience them. They also promote coping resources as buffers to the effects of stigma that drive health disparities. Regardless of stigmatized characteristic, Hatzenbuehler, Phelan, and Link (2013) recommend the synthesis of models of health disparities for members of stigmatized groups to better understand stigma as a social determinant of health.

Some more comprehensive models have grown out of the literature that may explain some of the dynamic processes of stigma and its impact on health. Pascoe and Richman (2009) proposed a conceptual model, which they supported with a meta-

analysis to describe how perceived discrimination affects physical and mental health outcomes. Perceived discrimination in their model maps well onto the construct of enacted stigma. In Pascoe and Richman's model, discrimination is conceptualized as a social stressor that affects health through the mechanism of physical or psychological stress responses, as well as engagement in negative health behaviors (or conversely, the lack of engagement in positive health behaviors).

Stigma and stress. Among PLWH, stress can impact HIV disease progression and it has been associated with lower CD4 cell counts (Leserman, 2003). Stress is an important variable to monitor in PLWH as it can impede immune functioning and interfere with achievement of viral suppression.

From a mechanistic perspective, there are a few different ways stigma functions as a stressor. Enacted stigma is often explicit interpersonal exclusion that is unpredictable and uncontrollable. Given the ambiguousness that sometimes underlies discriminatory experiences, people may have difficulty identifying the stressor and deciding on an appropriate coping response (Williams, Neighbors, & Jackson, 2003). Exposure to discrimination has been linked to physiological responses characteristic of a stress response including increased heart rate, increased blood pressure, and elevated cortisol levels (e.g., Clark, Anderson, Clark, & Williams, 1999). Pascoe and Richman recommended future investigation of chronic and recent events of discrimination that appear to have the most deleterious effect on health. Moreover, the mediated relationship of enacted stigma to physical health via stress may occur as individuals increasingly experience stigmatizing events. With increasing exposure to

stigma, physiological and psychological stress responses are activated and can lead to a chronic negative emotional state (Pascoe & Richman, 2009).

Anticipated stigma functions somewhat differently as a stressor. Instead of being marked by events of exclusion, anticipated stigma creates vigilance to negative treatment by others. This leads to a chronically aroused state that can deteriorate coping resources over time (Stuber, Meyer, & Link, 2008). Indeed, individuals living with chronic illnesses who report high levels of anticipated stigma also report high levels of perceived stress that impacts their quality of life (Earnshaw, Quinn, & Park, 2012).

Internalized stigma creates stress through the process of ongoing cognitive appraisals of negative societal attitudes applied to oneself. Internalized stigma has been associated with greater psychological distress (Ross & Rosser, 1996; Boone, Cook, & Wilson, 2016). Furthermore, individuals with internalized stigma are likely more sensitive to anticipated and enacted stigma (Chesney & Smith, 1999), and they likely have fewer interpersonal resources to cope (Helms, et al., 2016).

Coping with Stigma. Researchers hypothesize that coping resources buffer against the potentially negative effects of enacted stigma on health (Pascoe & Richman, 2009; Earnshaw, et al., 2015). In their meta-analytic review, Pascoe and Richman (2009) hypothesized about the role of coping resources in buffering the impact of enacted stigma on health. Similarly, Earnshaw, and colleagues (2013) indicated the need to investigate strength-based, modifiable resources that may moderate the effect of stigma on health outcomes. Few studies in the area of HIV have looked at specific coping strategies PLWH use to manage their experiences of HIV stigma. Varni, et al. (2012) examined the role of engagement and disengagement coping strategies on

depression, anxiety, and self-esteem among PLWH. Their findings suggested that engagement coping attenuated the relationship between stigma and self-esteem. Social support, the tangible and emotional support offered by others, is a promising resource for individuals facing stigma. Social support has demonstrated buffering effects on health in the more global health literature (Cohen, 2004). Seeking social support may help people regulate their emotions and problem solve under stress related to stigma (Earnshaw, et al., 2013). Results on the effect of social support as a coping resource have been mixed with some finding evidence that social support serves as a moderator and some finding no effect of social support (e.g., Earnshaw, et al., 2015; Logie, et al., 2012). Additional research is needed to determine the existence and magnitude of these relationships, and should also account for a variety of different coping strategies such as seeking other supportive resources (e.g., religion), and use of cognitive coping strategies (e.g., acceptance).

Maladaptive or avoidant coping strategies should also be addressed, particularly given the uncontrollable nature of stigma. Previous research suggests that individuals may engage in negative health behaviors like alcohol use as a means to escape the negative emotional and cognitive experiences associated with stigma (Pascoe & Richman, 2009). Given the stress and coping framework, maladaptive coping strategies like substance use become available when adaptive coping resources become overwhelmed by stress (Litt, Kadden, & Kabela-Cormier, 2009). Furthermore, high levels of disengagement coping have been associated with higher levels of anxiety and depression among PLWH reporting experiences of enacted stigma (Varni, et al., 2012),

creating a problematic cycle between distress and avoidance. These maladaptive or avoidant coping strategies may complicate clinical outcomes for PLWH.

Health outcomes pertinent to PLWH. Health outcomes among people living with HIV are evaluated along the HIV treatment cascade, or care continuum (Gardner, et al., 2011; Mugavero, et al., 2013). The continuum monitors the proportion of PLWH who are connected to testing resources and diagnosed; the number of people diagnosed who are linked to medical care; the number of people who remain engaged in their medical care; as well as the number of people prescribed antiretroviral treatment (ART). For individuals who are engaged in care and taking ART, the optimal outcome is HIV viral suppression, which reflects antiretroviral medication adherence. Adherence to ART and viral suppression improve the health of PLWH and significantly reduce the likelihood of HIV transmission (Cohen, et al., 2011). However, only about 30% of individuals who are living with HIV are virally suppressed according to estimates by the Centers for Disease Control (Bradley et al., 2014). This indicates the importance of psychosocial and behavioral factors that interfere with PLWH achieving optimal health. As stated in the National HIV/AIDS Strategy (2015), Americans with the least access to prevention and treatment services are those most affected by HIV. The writers further pointed to the management of stigma as one means to end these disparities.

The literature that links stigma to health outcomes has steadily grown over recent years. A meta-analysis of 24 studies indicated that HIV stigma is associated with negative mental and physical health outcomes including increased depression and greater evidence of HIV disease progression (Logie & Gadalla, 2009). Katz and

colleagues (2013) reviewed and meta-synthesized 75 quantitative and qualitative studies finding stigma as an inhibitor to ART adherence. Despite the growth of academic inquiry in this area, relatively little is known about the mechanisms that explain the relationship between stigma and health in the HIV literature (Rueda, et al., 2016). Rao and colleagues (2012) found that depressive symptoms partially mediate the relationship between HIV-related stigma and medication adherence. Another group of researchers found mediating effects of interpersonal factors on the relationship between stigma and medication adherence (Helms, et al., 2016). No studies to our knowledge have explicitly examined the roles of stress related to stigma and coping with enacted stigma in relationship to medication adherence or other health outcomes.

In the consideration of overall health and wellbeing among PLWH, co-occurring chronic and acute conditions should be considered in the management of HIV-related health. Mixed results have been found regarding the burden of co-morbid health conditions and retention in medical care (Corless, et al., 2008; Crawford, 2015). Some researchers have linked co-morbid health conditions and polypharmacy with lower ART adherence (Krentz & Gill, 2016). Examining co-occurring medical needs may be important for the assessment of health among PLWH, and a potential addendum to the HIV treatment cascade.

The HIV Epidemic in the State of Georgia

The Southern region of the United States is an important area for research related to HIV-related stigma and health. The incidence of new HIV diagnoses as of 2014 was the highest in the South with a rate of 18.5 per 100,000 people (for comparison the national

rate was 13.8 per 100,000 people; CDC, 2016). Not only are more people living with HIV in the South, more people are progressing to diagnoses of AIDS and dying from AIDS (CDC, 2015a). Considering the treatment options that are available to PLWH, these disparities must be considered in light of social determinants.

The state of Georgia ranked fifth out of the 50 states in the U.S. in the number of adults living with HIV in 2013 (CDC, 2015b). While over 60% of HIV cases are localized to the Atlanta and metropolitan-Atlanta area, rates of HIV in other health districts are significant given the population distribution in those areas. As of 2014 (the latest year for which data are available), the rate of PLWH in the North Central (Macon) area was 406 per 100,000 persons; the rate of HIV infection in the state of Georgia was 527 per 100,000 persons (Georgia Department of Public Health, 2016).

In Georgia, there are few resources for PLWH outside of the metro Atlanta area. Stigma is a high risk for individuals diagnosed with HIV living in suburban and rural Georgia with sparse opportunities for support. Furthermore, little research has been carried out on the experiences of stigma and health among PLWH who reside in middle Georgia. This represents a novel population for which it is important to investigate how HIV stigma may act as a barrier to health.

Current Study

The purpose of the present study is to build on the existing literature about the experience of HIV stigma and its relationship to health among PLWH living in the southern United States and to explore potential mechanisms of that complex relationship. The first research question aims to answer whether there is a direct

relationship between internalized HIV stigma and health. Consistent with models of stigma and discrimination on health, a negative relationship between internalized HIV stigma and HIV-related health outcomes is expected, such that participants who endorse higher levels of stigma will have lower medication adherence, and be less likely to be virally suppressed.

The next research questions will address potential mediating effects of internalized HIV stigma, including stress and maladaptive coping strategies. It is expected that both the stress associated with enacted stigma and maladaptive strategies for coping with events of enacted stigma will strengthen the relationship between internalized HIV stigma and negative health outcomes. The final research question will assess the potential moderating effect of adaptive coping responses such as acceptance, seeking social support, and spiritual coping. It is expected that adaptive coping resources will buffer the relationship between HIV stigma and HIV-related health outcomes. The proposed model illustrating these hypothesized relationships is depicted in Figure 1. Overall, the current study seeks to understand mechanisms of HIV-related stigma on health within a stress and coping framework.

Methods

Participants and Procedures

Participants were recruited from a Ryan White funded clinic located in Macon, GA between February and May 2016. To be included in the study, participants had to be 1) 18 years or older, 2) able to understand all study procedures and provide informed consent, 3) HIV-positive, and 4) a clinic patient attending an initial or update

appointment. Patients were approached by a research staff member in the clinic waiting area and informed about the opportunity to participate in the study. To reduce any pressure on patients to participate in the clinic survey, no clinic staff members were involved in recruiting participants. If a patient expressed interest, they were provided an e-tablet with headphones that administered the consent form via audio-computer assisted self-interview (ACASI). After reading and/or listening to the consent form participants were invited to ask any questions and then signed a consent form if they agreed to the study procedures. A total of 258 people were approached, 58 individuals refused to participate, and 199 patients agreed to complete study procedures (77%).

Following consent, participants were again provided with an e-tablet with headphones and completed their ACASI survey that was de-identified with a participant identification number. The survey took approximately 30 minutes to complete. Participants were each compensated for their time with a \$15 gift card.

As part of informed consent, participants provided release of information to access health information from their electronic medical record including clinic attendance, viral load, CD4 count, and medications inclusive of the date of their current appointment to six months prior. Medical data were collected through retrospective chart review, linked by date of birth. No other identifying information was collected. Research staff collected and coded chart data. No clinic staff members were involved in chart data collection to protect participant privacy. The University of Connecticut and the Mercer University Institutional Review Boards approved all study procedures. In addition, a Certificate of Confidentiality was sought to protect participants' information.

Self-Report Measures

Socio-demographic Information. Participants were asked their age, self-identified gender, race, sexual orientation, education attainment, employment status, religion, and history of incarceration. Indicators of poverty were assessed including availability of transportation, housing security, and food sufficiency in the past month.

Health Information. Health information including the date of their first HIV antibody test, whether they are currently taking antiretroviral medications, and questions about their antiretroviral medication adherence, including a visual analog scale (VAS) of adherence in the past month, were asked. We dichotomized self-reported medication adherence as adherent (reported $\geq 85\%$ on VAS) and non-adherent ($< 85\%$ on VAS). Questions were also asked to assess whether participants hid their antiretroviral medications (e.g., physically hide medications, take medications out of their bottles, tell people medications are for something else). Service utilization was assessed including attendance to a mental health counselor, substance use counselor, HIV support group, and/or Alcoholics Anonymous/Narcotics Anonymous group in the past month.

Health-related quality of life (HRQL) was also assessed using items from the Center for Disease Control and Prevention's Behavioral Risk Factor Surveillance Survey health-related quality of life items (CDC, 2000). These items included assessment of general health status, number of days in the past month that physical health was not good, number of days in the past month when activity was limited as a result of physical health, number of days in the past month when pain was present, and number of days in the past month when health was good.

Depressive symptoms were assessed using the Center for Epidemiological Studies - Depression Scale (CES-D; Radloff, 1977). The CES-D includes 20 items assessing cognitive, affective, and vegetative symptoms of depression. Radloff (1977) suggested a clinical cutoff of 16 to indicate possible depression, or a stricter cutoff of 23 to indicate probable depression. Reliability of the CES-D was good in the current sample (Cronbach's $\alpha = .889$). In accordance with Kalichman, Rompa and Cage's (2000) findings that somatic symptoms on the CES-D may be explained by HIV symptoms, the cognitive/affective item score on the CES-D was also calculated and had acceptable internal consistency (Cronbach's $\alpha = .798$).

Alcohol use and symptoms of alcohol dependence were assessed with the Alcohol Use Disorder Identification Test (AUDIT; Saunders, et al., 1993; Schmidt, Barry & Fleming, 1995). The AUDIT, developed by the World Health Organization (WHO), includes 10 items used to assess alcohol use and problematic behaviors resultant of alcohol use. A cutoff score of 8 or above is suggested to identify individuals who have problematic patterns of alcohol use. Participants skipped out of the last 9 questions of the measure if they reported they do not drink any alcohol on the first question, which assesses alcohol consumption. This scale also showed good internal consistency in the present sample, Cronbach's $\alpha = .847$. In addition, participants were asked about their use of drugs in the past month including marijuana, cocaine, and any other drug without a prescription.

Internalized HIV Stigma. The HIV Stigma Mechanisms Scale (Earnshaw, et al., 2013), internalized stigma subscale (6 items) was used to assess internalized HIV stigma. Participants responded to items assessing their negative feelings about living

with HIV (e.g., *I feel ashamed about having HIV*) on a Likert scale. Higher scores indicate greater internalized stigma (greater agreement with negative statements). In accordance with scoring procedures carried out by the scale authors, responses across the 6 items were averaged to create a composite score. Internal consistency of items in the subscale was very good in the present sample, Cronbach's alpha = .914.

Enacted HIV Stigma Checklist. Experiences of enacted HIV stigma (perceived discrimination) were assessed using 20 questions adapted from multiple enacted HIV stigma measures. Items were selected from the enacted stigma subscale of the HIV Stigma Mechanisms Scale (Earnshaw, et al., 2013), the HIV Stigma Scale (Bunn, et al., 2007; Berger, et al., 2001), and the Multiple Discrimination Scale – HIV version (Bogart, Landrine, Galvan, Wagner, & Klein, 2013). Participants were asked about the frequency with which they experienced any of the items in the past year due to their HIV-positive status on a scale: 5 = almost everyday, 4 = at least once a week, 3 = a few times a month, 2 = a few times this year, 1 = about once this year, 0 = never. Responses across the 20 items were averaged to create a composite score. Reliability of items was very good in this sample, Cronbach's alpha = .934.

Stigma-Related Stress. For every item on the enacted HIV stigma checklist that participants endorsed occurring in the past year, they rated the negative impact (stress) that the event had on them. This involved asking one item for every enacted stigma event that a participant endorsed: "Please rate the level of negative impact this event had on you on a scale from 0 (*no negative impact at all*) to 10 (*the most severely negative event you can imagine*)." This stress item is adapted from the UCLA Life Event Stress Interview (Hammen, Adrian, Gordon, Burge, Jaenicke, & Hiroto 1987), which is

an interview schedule designed to assess chronic and acute life events/stressors. A composite stress score was calculated for each participant by averaging their stress scores across the 20 enacted stigma items. Participants' stress rating on the most impactful enacted stigma event in the past year was used in multivariate analyses.

Coping. The Brief COPE (Carver, 1997) was used to assess coping strategies used to deal with the most stressful experience of enacted HIV stigma in the past year. The Brief COPE is a 28-item, 14-scale measure of coping styles that was adapted from the original 60-item COPE (Carver, Scheier, & Weintraub, 1989), a validated measure of dispositional and situational coping. The 14 scales in the Brief COPE include Self-distraction (*"I've been turning to work or other activities to take my mind off things."*), Active coping (*"I've been concentrating my efforts on doing something about the situation I'm in."*), Denial (*"I've been refusing to believe that it has happened."*), Substance use (*"I've been using alcohol or other drugs to make myself feel better."*), Use of Emotional Support (*"I've been getting comfort and understanding from someone."*), Use of instrumental support (*"I've been getting help and advice from other people."*), Behavioral disengagement (*"I've been giving up trying to deal with it."*), Venting (*"I've been saying things to let my unpleasant feelings escape."*), Positive reframing (*"I've been looking for something good in what is happening."*), Planning (*"I've been thinking hard about what steps to take"*), Humor (*"I've been making jokes about it."*), Acceptance (*"I've been accepting the reality of the fact that it has happened."*), Religion (*"I've been praying or meditating."*), and Self-blame (*"I've been criticizing myself."*). Carver (1997) made no recommendations for categorizing coping styles (e.g., maladaptive vs. adaptive coping; problem-focused vs. emotion-focused) beyond the

individual scales on the Brief COPE, but did recommend creating higher order factors from one's data (Carver, et al., 1989) if appropriate to the research question at hand.

Before beginning the Brief COPE, participants were first asked to choose which enacted stigma event out of those they endorsed in the past year had the most negative impact on them. They were then asked to think about the last time that event happened and what they did to cope with it, by rating items on the Brief COPE on a scale from 1 (*I haven't been doing this at all*) to 4 (*I've been doing this a lot*). The Brief COPE was designed to concisely assess coping strategies related to a specific stressor, and it has been widely used in health populations, including PLWH (e.g., Turner-Cobb, et al., 2002). Internal consistency of the Brief COPE was very good in the present sample, Cronbach's alpha = .923

Chart Abstracted Health Data

Research staff abstracted medical information from patient charts, linked to study identification number by date of birth. Information abstracted ranged from the date of study survey over the six months prior. Viral load and CD4 cell counts were abstracted from participants' medical charts to verify medication adherence and assess HIV disease progression. Viral suppression (undetectable viral load) was defined as viral load of less than 20 copies/ml, which is a sensitive threshold and how the clinic defined an undetectable viral load. A CD4 threshold of 200 cells per cubic mm of blood was the cutoff for disease progress, indicating a damaged immune system. In addition, clinic appointment attendance was abstracted for the six months prior to the date of survey completion. Non-attendance was defined as missing one appointment without

cancellation, or rescheduling more than one appointment in the past six months, similar to previous measures of clinic non-attendance (e.g., Catz, McClure, Jones, & Brantley, 1999). Participants' current (active) medications were also assessed to confirm antiretroviral regimen and to determine the presence of co-morbid health conditions. Total number of active medications was used as a proxy measure of the burden of co-occurring medical conditions.

Data Analytic Strategy

Prior to analysis, all data was cleaned and checked for technical or computational errors. All analyses were done in SPSS version 21. Descriptive analyses were carried out to assess the distribution of study variables and to describe the sample. Correlation analyses were also conducted to examine relationships between demographic and health variables in the sample. Frequency and descriptive analyses were used to describe endorsement of experiences on the enacted stigma checklist that was developed for this study.

Consistent with the literature on enacted stigma and discrimination (e.g., Bogart, et al., 2013), not all participants endorsed an experience of enacted stigma in the past year. Chi-square comparisons for categorical variables and *F* tests for continuous variables were used to assess group differences between participants who endorsed an enacted stigma event in the past year ($n=96$) compared to those who denied experiencing any events in the past year ($n=103$).

The remainder of analyses was carried out on the sample of participants who endorsed experiencing enacted stigma in the past year. Bivariate analyses were used to

determine relationships between demographic variables and outcome variables (i.e., stress, coping, health indicators) to identify control variables to be used in analyses. Correlations were also examined between stigma, stress, coping, and health variables.

Finally, multivariate analyses were used to examine the relationships between each predictor variable in the path model and health outcome variables. We started by conducting a series of linear and logistic regression analyses to evaluate the relationship between predictors and health outcomes. Next, the hypothesized study model was tested using path analysis via Preacher and Hayes regression-based PROCESS tool (Model 14 with 2 mediators and 1 moderator; Hayes, 2013). Dichotomous medication adherence was the outcome variable in the path analysis given the precedent in the literature described in the introduction. Bootstrapping was used to test for effects without assuming normality in the sampling distribution (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Results

Description of socio-demographic characteristics

Participants included a total of 199 men and women. A description of the study sample's demographic information can be found in Table 1. Participants ranged in age from 18 to 77 years old, with a mean age of 45.7 (SD: 12.0). A majority of the sample identified as male (62%). Nine individuals (5%) identified as transgender. A large majority identified their race as African American/Black (84%); 13% identified as White, 1% Hispanic or Latino, 2% as biracial or multiracial, and 1% identified as 'Other.' A relative majority identified their sexuality as heterosexual (56%), 30% identified as

homosexual, and 11% identified as bisexual. Most participants identified their religion as Christian (75%). Most of the sample reported completing high school or beyond (77%), and 23% reported not completing high school. In terms of employment, 13% were working full-time, 10% part-time, 40% were on disability, 35% were unemployed, and 3% were students. A total of 100 participants (50%) endorsed a history of incarceration.

Participants represented 34 unique zip codes, traveling between approximately 0 and 73 miles to the clinic ($M=19.6 \pm 14.0$). A total of 34 participants (17%) reported having unreliable transportation (i.e., could not get to the clinic or to a place to get meals because they did not have a ride) in the past month. A total of 23 participants (12%) reported having unstable housing (i.e., did not have a place to stay or worried about having a place to stay) in the past month. Also, in the past month, 59 participants (30%) endorsed having insufficient food (i.e., chose between spending money on medicine or food, ran out of food, ran out of money for food or could afford enough food, or ate less than needed because there was not enough food).

Health and Medical Characteristics

Self-reported health information. Health-related characteristics of the sample are reported in Table 2. Participants had been living with HIV for an average of 13.5 years (SD: 8.7, range: 0-36 years). Only 13 participants (7%) reported that they attended an HIV support group in the past month. The vast minority of the sample, 4% ($n=9$) reported not currently taking antiretroviral medications. On a visual analog scale, participants reported taking 85.7% (SD: 26.3, range: 0-100%) of their medications in the

past month on average. Nearly half (42%) of the sample reported that they had made attempts to hide their antiretroviral medications in the past month.

In terms of psychological health, the mean score on the CES-D was 15.6 (SD: 11.5, range: 0-52), slightly below the recommended clinical cutoff for possible depressive symptoms suggested by Radloff and colleagues (1977). A total of 79 participants (40%) met or exceeded the clinical cutoff of 16 indicating possible clinical depressive symptoms. By increasing the clinical cutoff to 23, indicating probable depression, 48 participants (24%) met or exceeded the cutoff. On the cognitive/affective items, the mean score was 8.3 (SD: 6.4). Only 23 participants (12%) reported they had seen a mental health counselor in the past month.

On the AUDIT total scores were considerably variable with a mean of 3.6 (SD: 5.4, range: 0-33), and 75 participants reported never drinking alcohol in the past year. A total of 34 participants (18%) met or exceeded the clinical cutoff of eight, suggesting problematic alcohol use. Only 12 participants (6%) reported they had seen a substance use counselor in the past month, and 27 participants (14%) endorsed attending Alcoholics Anonymous/Narcotics Anonymous groups in the past month.

Chart abstracted health data. According to clinic appointment attendance data, approximately half (54%) of the participants attended all of their scheduled appointments in the past six months, while 46% missed an appointment or cancelled more than one appointment. The modal number of appointments scheduled in the past six months was 3 (range: 2-5). The average number of active medications listed in participants' charts was 5.6 (SD: 3.8), including an average of 1.9 (SD: 1.2) HIV medications and 3.7 (SD: 3.4) medications for other conditions. Viral load data showed

that 64% of the sample had an undetectable viral load. Only 10% of the sample had a CD4 cell count below 200 cells per cubic millimeter of blood, indicating a significantly impaired immune system.

Co-occurring health conditions were estimated by active medications listed in participants' medical records. Nearly half of the sample received treatment for cardiovascular/cerebrovascular conditions (n=97, 49%). A total of 74 individuals (37%) were receiving treatment for co-occurring infections (bacterial, viral, or fungal). Psychotropic medications were the next most common active medications among approximately one third of the participants (n=66; 33%); with 58 participants (29%) prescribed antidepressant treatment. The next most common active medication was pain treatment among 25% (n=50) of the sample.

Description of stigma experience

The mean score on the internalized stigma subscale was 2.4 (SD: 1.2, range 1-5). This score indicated that participants tended to disagree or feel uncertain that they had internalized HIV stigma. A total of 96 (48%) participants endorsed experiencing at least one event of enacted stigma in the past year. A full description of the enacted stigma measure can be found in Table 3. On average, participants reported experiencing between two and three different types of enacted stigma events (range: 0-20). They endorsed being treated differently by people most (31%), followed by being rejected by a potential sexual or romantic partner (23%). Events with the least frequency of endorsement were having one's personal property stolen or damaged (2%), and being physically assaulted or beaten (3%).

Descriptive data regarding the enacted stigma events participants selected as the most impactful in the past year are shown in Table 4. Participants tended to experience a moderate level of stress ($M: 4.8$, $SD: 3.3$) in reaction to the most impactful enacted stigma event. Averaging stress across all items showed relatively low, but variable ratings of the negative impact of enacted stigma events in the past year ($M: 1.5$, $SD: 2.0$, Range: 0-8.8). The frequency of events rated as most impactful ranged from about once in the past year (38%), a few times in the past year (23%), a few times per month (8%), at least once a week (4%), to almost everyday (19%).

When comparing between groups of participants who endorsed experiencing enacted stigma in the past year versus those who did not endorse experiencing an event (Table 5), they did not differ significantly on any demographic variables. People who endorsed enacted stigma in the past year were more likely to have food insufficiency ($\chi^2(2, N=199)=15.2$, $p<.001$). Comparisons among health and medical variables are shown in Table 6. Groups differed in that those who endorsed an event of enacted stigma in the past year had higher levels of depression ($F(1, 190)=10.1$, $p=.002$); they scored higher on the AUDIT ($F(1, 195)=7.1$, $p=.008$), and they had higher internalized HIV stigma ($F(1, 195)=13.7$, $p<.001$).

Brief COPE factor analysis

As recommended by Carver (1997), the present data were used to identify categories of coping using the Brief COPE in the population of interest. A Principal Component Analysis was conducted with a Varimax rotation. The 14 scales of the Brief COPE were entered as variables rather than using individual items. Correlations

between the 14 subscales are presented in Table 7. The cutoff for factor loadings was set to .50 as recommended by Comrey and Lee (1992). The factor analysis yielded 3 factors with Eigenvalues greater than 1 that accounted for 61% of the total variance. The 3-factor structure with factor loadings is shown in Table 8. Based on the factor structure, the 3 factors are described as follows: maladaptive coping (Denial, Substance use, Behavioral disengagement, Venting, Humor, Self-blame; accounting for 22% of total variance), adaptive cognitive coping (Self-distraction, Active coping, Positive reframing, Planning, Acceptance; 22% of total variance), and adaptive supportive coping (Emotional support, Instrumental support, Religion; accounting for 17% of total variance). These factors align with other published factor analyses of the Brief COPE with populations affected by HIV (Prado, et al., 2004). Composite scores were calculated for each of the coping factors. Given that the proposed model for this study included adaptive coping as one variable, the adaptive cognitive coping and supportive coping were combined into one variable composite score for analysis. A description of Brief COPE subscales and factors in reaction to the most impactful event of enacted HIV stigma in the past year is shown in Table 9. The approaches to coping that were endorsed most frequently in this sample included acceptance, religious coping, and positive reframing.

Bivariate Analyses

Exploratory correlation analyses in the full sample. Correlations were first examined among sociodemographic and mental and physical health variables in the full sample to confirm validity of measures (e.g., medication adherence self-report measure

was associated with viral load abstracted from medical record). Correlations are shown in Table 10. Measures of internalized and enacted stigma were positively correlated ($r=0.36$, $p<.001$). Internalized stigma was related to both depressive symptoms ($r=-0.43$, $p<.001$) and alcohol use ($r=-0.21$, $p=.003$); while enacted stigma related only to depressive symptoms ($r=-0.36$, $p<.001$). Internalized stigma was negatively correlated with total number of active medications ($r=-0.14$, $p<.05$). Viral load detectability was negatively related VAS medication adherence ($r=-0.32$, $p<.001$) and viral load status related to immune functioning ($\phi=0.25$, $p=.001$) as expected.

Relationships between sociodemographic characteristics and outcomes.

Correlations between demographic and study variables were examined first to determine which demographic variables to control for in multivariate analyses (Table 11). Employment (working vs. not working) was associated with stress related to the most impactful enacted stigma event in the past year ($r=-0.21$, $p=.05$). Employment was also associated with maladaptive coping ($r=-0.28$, $p<.01$). Age ($r=0.44$, $p<.01$), years since HIV diagnosis ($r=0.38$, $p<.01$), gender ($r=0.25$, $p=.01$), and employment ($r=-0.32$, $p<.01$) were all associated with total number of active medications. Gender ($\phi=-0.22$, $p=.03$), sexual minority status ($\phi=0.26$, $p=.01$), and unstable housing ($\phi=0.26$, $p=.01$) all related to viral load (detectable vs. undetectable). Education attainment was associated with having a CD4 cell count below the threshold of 200 ($r=-0.23$; $p=.03$). Significant covariates were controlled for in analyses of respective outcome variables (e.g., education was controlled for when CD4 cell count was the outcome variable).

Relationships among study variables. As expected, internalized stigma was significantly correlated with stress indexed on enacted stigma ($r=0.37$, $p<.01$),

maladaptive coping ($r=0.47$, $p<.01$), and adaptive coping ($r=0.24$, $p=.02$). Stress associated with the most impactful event of enacted stigma was positively associated with both maladaptive ($r=.31$, $p<.01$) and adaptive coping ($r=0.25$, $p=.02$). Among the health variables, medication adherence was significantly related to viral load ($\phi=-0.30$, $p<.01$), viral load status was correlated with CD4 cell count ($\phi=0.24$, $p=.02$), and total number of active medications was also related to CD4 cell count ($r=0.27$, $p<.01$).

Multivariate relationships of HIV stigma on health

Individual regression analyses were conducted to examine the relationships between study variables and HIV-related health outcomes. Results from linear and logistic regression analyses are presented in Table 12. First the relationships between the independent variable (internalized stigma), proposed mediator variables (stress and maladaptive coping), and moderator variable (adaptive coping) were examined. Internalized HIV stigma significantly predicted stress associated with the most impactful event of enacted stigma $B(SE)=0.92(0.26)$, $p=.001$; maladaptive coping $B(SE)=0.55(0.11)$, $p<.001$; and adaptive coping $B(SE)=0.29(0.12)$, $p=.02$. The only health outcome predicted by internalized HIV stigma was CD4<200 $AOR=2.15(0.11)$, 95% CI [1.04-4.46], $p=.04$.

Path analysis with bootstrapping was used to test the proposed study model. Results of the path analyses are presented in Table 13 and are reported in unstandardized form to promote interpretation based on the metrics used in the study. Variables at the front of the hypothesized model were significantly related, as can be seen in Figure 2. Specifically, internalized HIV stigma predicted stress associated with an impactful enacted stigma event in the past year (path a =.917, $p<.001$, 95% CI [0.39-

1.44]). Internalized HIV stigma also predicted maladaptive coping strategies used to cope with enacted stigma in the past year (path $b = .571$, $p < .001$, 95% CI [0.34-0.80]). However, there was no evidence that internalized HIV stigma, stress, or maladaptive coping predicted medication adherence. Thus mediation of the relationship between internalized stigma and medication adherence was not present. Additionally, there was no evidence for moderation by adaptive coping strategies.

Discussion

The present study examined the relationships between HIV-related stigma and health outcomes in a sample of PLWH attending clinic appointments in middle Georgia. Specifically, we examined the effect of HIV stigma through the mechanisms of stress related to a recent, salient enacted stigma experience and efforts to cope with that event. A recent meta-analysis pointed out the lack of literature investigating the mechanisms and attenuating factors involved in the relationship between stigma and health outcomes (Rueda, et al., 2016). The present investigation sought to add to the growing body of research filling that gap.

Endorsement of HIV stigma was relatively low in this sample and aligned with previous investigations of HIV stigma in populations living in other geographic areas in the United States (Bogart, et al., 2013; Earnshaw, et al., 2013; Chaudoir, et al., 2012; Vanable, Carey, Blair, & Littlewood, 2006). Overall, internalized stigma was reported in the moderate to low range and approximately half the sample did not endorse an experience of enacted stigma in the past year. One might expect that every person living with HIV experiences HIV stigma. However, there are many reasons this may not

be the case. Many individuals living with HIV do not disclose their HIV status to others, which limits the opportunities for enacted stigma to occur. Unfortunately, this same process may contribute to individuals not seeking the medical support they need or attend clinic appointments at all. Disclosure was not assessed in this study so no conclusions can be drawn about the relationship between openness about HIV status and enacted stigma. Moreover, PLWH typically have other stigmatized characteristics (e.g., race, gender, sexual preference), which take precedence over their HIV status or interact with HIV-related stigma (Bogart, et al., 2013). Individuals who endorsed enacted stigma in the past year reported moderate levels of subjective stress associated with salient stigmatizing events, and they endorsed using several different approaches to coping with enacted stigma. Acceptance, religious coping, and positive reframing were the most frequently endorsed coping strategies for enacted stigma events in this sample. Individuals who endorsed enacted stigma in the past year were more likely to have greater food insecurity, symptoms of depression, alcohol abuse, and internalized HIV stigma compared to individuals who did not endorse enacted stigma in the past year. While these comparative findings may corroborate the literature linking HIV stigma to poorer mental health outcomes among PLWH, study hypotheses were tested to examine the relationships between HIV stigma and physical health outcomes in this sample.

The first hypothesis predicted a negative relationship between internalized HIV stigma and HIV-related health outcomes. Among the health outcomes in this study, higher levels internalized HIV stigma was associated with greater HIV disease progression based on a CD4 threshold indicating a compromised immune system (CD4

< 200). This finding suggests that internalization of stigma is heightened when overt symptoms of disease present and people can no longer control disclosure of their HIV status. In this sample, internalized HIV stigma did not significantly predict medication adherence, viral suppression, clinic attendance, or number of active medications.

The second study hypothesis predicted co-mediating effects of stress indexed on a salient enacted stigma event and maladaptive coping strategies on the relationship between internalized stigma and HIV-related health outcomes, specifically medication adherence. Internalized stigma was significantly related to stress indexed on enacted stigma, such that every one-unit difference in internalized stigma conferred a .917 difference in stress. Internalized stigma also predicted maladaptive coping such that one unit difference in stigma conferred a .571 difference in maladaptive coping. However, neither of these paths mediated the relationship between internalized stigma and health behavior, medication adherence in this case.

The final study hypothesis predicted a moderating effect of adaptive and supportive coping strategies on the relationship between internalized HIV stigma and health. Once again, there was not evidence in this sample supporting the moderating role of adaptive and supportive coping resources on HIV-related health outcomes.

There are several potential reasons for the lack of statistically significant effects found for internalized HIV stigma, stress, and coping resources on medication adherence. First, stress and coping were indexed on a single, salient event of enacted stigma in the past year. This may have limited the range of stressful experiences as well as the compounding effects of multiple stigmatizing events in the past year and beyond that time frame. It is possible that internalized and enacted stigma have short-term

effects on mental health outcomes such as depressive symptoms and alcohol use. Effects on physical health may compound over time and take longer to show significant effects, especially when considering stigma as a chronic stressor in the lives of people who are stigmatized. On the other hand, directionality of these relationships cannot be determined from this study. Individuals with poorer mental health may be more sensitive to HIV stigma. A next step for research in this area should make use of prospective and longitudinal data to parse out the directions of these relationships.

Other contextual factors likely contribute to the impact of HIV stigma on health. One could contextualize stigma in an ecological framework of health (Whetten-Goldstien & Pence, 2013), which widens the potential mechanisms at the individual, environmental, and systemic levels. Indeed, in a recently published study, authors hypothesized that interpersonal factors contribute to the impact of HIV stigma on medication adherence given the interpersonal nature of stigma (Helms, et al., 2016). They found that attachment-related anxiety and concern with being seen while taking ART medications influenced the relationship between stigma and adherence. The present study exclusively examined intrapersonal factors of stress and coping as they impact the relationship between HIV stigma and health and may have limited effects.

A few study limitations are worth noting. The cross-sectional approach to the present data analysis is a chief limiting factor. Cross sectional data limits the interpretation of mediated and moderated relationships and directionality of relationships cannot be determined. Future research could follow participants longitudinally to assess the effect of HIV-related stigma and its mechanisms on health among PLWH over time. Second, levels of stigma were relatively low in this sample.

While the relatively low endorsement of stigma may be consistent with previous findings in the literature (e.g., Bogart, et al., 2013; Earnshaw, et al., 2013; Chaudoir, et al., 2012; Vanable, Carey, Blair, & Littlewood, 2006), it did limit power in conducting analyses in this study. Given that low endorsement of internalized and enacted stigma may be expected, larger samples should be recruited in future investigations in order to increase power in statistical tests.

Enacted stigma in the past year was assessed exclusively based on HIV-positive status. Intersectionality and layering of different types of stigmatized identities (e.g., race-based, sexual orientation, mental health and substance use, socioeconomic status) are very likely to impact health in this population. Stigma based on HIV status was accounted for in this study to fully understand the mechanisms of HIV-related stigma in a population of PLWH living in the rural south. However, this may be too narrow a focus and the wider interpersonal and intrapersonal context should also be considered. Future research could expand on these findings to account for other types of discrimination, or ask participants which form of discrimination is most salient in their lives. Mixed methods approaches may also be a valuable avenue for understanding the nuances by which HIV-related stigma influences PLWH psychologically.

Finally, the present study sample was one that was engaged in care at a specialty HIV clinic. Consequently, conclusions cannot be drawn about the role of HIV-related stigma and discrimination among people who have not engaged in care or who have lapsed in their HIV care for more than six months. One could assume that individuals not engaged or lapsed in care are likely most afflicted by HIV-related stigma.

Some thought should be given to how to engage these individuals in future research as well as medical care.

In spite of these limitations, this is one of few studies to exclusively assess the role of HIV-related stigma on health outcomes, through the mechanisms of stress and specific coping strategies indexed on recent events of enacted HIV stigma. This approach created a fuller understanding of specific enacted stigma experienced by PLWH living in a low resource area in the Southeast. Another strength is the use of chart information rather than relying exclusively on self-report for health outcomes of interest.

Conclusions

The present study examined the experience of HIV stigma in a sample of PLWH residing in middle GA and receiving medical care at a Ryan White clinic. It also sought to examine the mechanisms by which HIV stigma relates to health outcomes in this population. While strong relationships were found between internalized stigma, enacted stigma, stress, and coping; together these mechanisms did not translate to significant health outcomes in this sample. It is possible that focusing on specific experiences of enacted HIV stigma limited effects by not accounting for the compounding, chronic stress of stigma. It is also possible that focusing exclusively on HIV stigma did not account for the wider context of other stigmatized identities or the intersectionality of stigma on health outcomes. Future research should focus on prospective and longitudinal studies to explore the mechanisms of the effects of stigma on health in PLWH. Qualitative investigations may also be useful to understand the nuanced effects

of stigma in the lives of PLWH for which quantitative studies are not sensitive enough to uncover. From a clinical perspective, individuals who endorsed experiences of enacted HIV stigma in the past year tended to have greater psychosocial and mental health concerns. Symptoms of depression and alcohol use likely translate to poorer physical health over time. From a clinical intervention perspective, HIV stigma is an important piece of the context of health disparities for PLWH and should be attended to in interventions. Based on the moderate level of endorsement of HIV stigma in this sample and others, individuals may not be motivated to participate in an intervention focused specifically on stigma. But, clinicians and researchers can potentially improve mental health outcomes by including material specific to HIV stigma so that PLWH can feel in control of their reactions to such experiences and fully utilize their coping resources. Comprehensive assessments of stigma in this population may be useful to determine areas that can be targeted in intervention. Moreover, health interventions implemented in HIV care settings, such as stress management or medication adherence or adjustment to HIV, could include material specific to managing HIV stigma. Clinical intervention researchers may add to these efforts by assessing the acceptability of stigma-related content in addition to the comparative effectiveness of interventions containing stigma-related content compared to traditionally-implemented therapeutic interventions.

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Table 1. Descriptive statistics of socio-demographic characteristics, full sample (N=199).

Characteristic	n (%)
Age (M \pm SD, range)	45.7 \pm 12.0, 18-77
Gender	
Male	123 (62%)
Female	74 (37%)
Transgender	9 (5%)
Race	
African American/Black	167 (84%)
White	25 (13%)
Hispanic Latino	2 (1%)
Biracial or Multiracial	3 (2%)
Other	2 (1%)
Sexual Orientation	
Homosexual/Same sex loving	59 (30%)
Bisexual	22 (11%)
Heterosexual/Straight	112 (56%)
Education Level	
Less than HS degree	45 (23%)
HS degree or equivalent	70 (35%)
More than HS degree	84 (42%)
Employment	
Working full time	26 (13%)
Working part time	19 (10%)
On disability	79 (40%)
Unemployed	69 (35%)
Student	5 (3%)
Religion	
Christian	148 (75%)
Agnostic/Atheist	2 (1%)
Spiritual but not religious	20 (10%)
Other	28 (14%)
Ever incarcerated	100 (50%)
In the past month:	
Unreliable Transportation	34 (17%)
Unstable Housing	23 (12%)
Insufficient Food	59 (30%)

Table 2. Health and medical characteristics of full sample (N=199).

Characteristic	M ± SD, range, or n(%)
Years since HIV Diagnosis	13.5 ± 8.7, 0-36
Taking ARVs (self-report)	190 (96%)
Visual analog medication adherence	85.7 ± 26.3, 0-100
Medication adherence > 85%	144 (72%)
# Active medications	5.6 ± 3.8
# Antiretroviral medications	1.9 ± 1.2
# non-HIV medications	3.7 ± 3.4
Clinic attendance past 6 months:	
Missed appointments	91 (46%)
Attended all appointments	108 (54%)
Most recent viral load	2432.5 ± 11517.4
Viral Load Status:	
Detectable (≥20 copies/mL)	66 (33%)
Undetectable	127 (64%)
Most recent CD4 count	575.4 ± 307.3
CD4 cell count < 200	19 (10%)
CESD	15.6 ± 11.5, 0-52
AUDIT	3.6 ± 5.4, 0-33
In the past month:	
Mental health counselor	23 (12%)
Substance use counselor	12 (6%)
AA/NA meeting	27 (14%)
HIV support group	13 (7%)
Health-related quality of life past month:	
General health ≥ “good”	163 (82%)
Health not good ≥ 2 weeks	63 (32%)
Health kept from activities ≥ 2 weeks	50 (25%)
Pain ≥ 2 weeks	56 (28%)
Comorbid treatment:	
Pulmonary treatment	36 (18%)
Diabetes treatment	18 (9%)
Hepatitis C treatment	2 (1%)
Infection treatment	74 (37%)
Cardiovascular treatment	97 (49%)
Gastrointestinal treatment	34 (17%)
Pain treatment	50 (25%)
Urinary/prostate treatment	6 (3%)
Thyroid treatment	6 (3%)
Psychotropic treatment	66 (33%)
Sleep aid	7 (4%)

Table 3. Enacted stigma item endorsement.

In the past year...	n (%)
<i>People have treated me differently</i>	61 (31%)
<i>Family members have avoided me</i>	23 (12%)
<i>Family members have looked down on me</i>	26 (13%)
<i>Community/social workers have discriminated against me</i>	22 (11%)
<i>Healthcare workers have avoided touching me</i>	17 (9%)
<i>I have lost friends by telling them I have HIV</i>	29 (15%)
<i>People seem afraid of me</i>	32 (16%)
<i>People have physically backed away from me</i>	35 (18%)
<i>People who know I have HIV ignore my good points</i>	35 (18%)
<i>People don't want me around their children</i>	28 (14%)
<i>I have been treated with hostility or coldness by strangers</i>	27 (14%)
<i>I have been ignored, excluded or avoided by people close to me</i>	29 (15%)
<i>I have been rejected by a potential sexual or romantic partner</i>	45 (23%)
<i>Someone acted as if I could not be trusted</i>	25 (13%)
<i>I was denied a place to live or lost a place to live</i>	9 (5%)
<i>I was treated poorly or made to feel inferior when receiving healthcare</i>	18 (9%)
<i>I was denied a job or lost a job</i>	12 (6%)
<i>Someone insulted or made fun of me</i>	28 (14%)
<i>My personal property was damaged or stolen</i>	3 (2%)
<i>I was physically assaulted or beaten</i>	5 (3%)
Range # events endorsed in the past year	0 - 20
Mean # events endorsed in the past year	M: 2.6 (SD: 4.3)

Table 4. Enacted stigma item selected as most impactful in the past year.

In the past year...	n (%)
<i>People have treated me differently</i>	20 (10%)
<i>Family members have avoided me</i>	4 (2%)
<i>Family members have looked down on me</i>	5 (3%)
<i>Community/social workers have discriminated against me</i>	0 (0%)
<i>Healthcare workers have avoided touching me</i>	3 (2%)
<i>I have lost friends by telling them I have HIV</i>	5 (3%)
<i>People seem afraid of me</i>	3 (2%)
<i>People have physically backed away from me</i>	2 (1%)
<i>People who know I have HIV ignore my good points</i>	3 (2%)
<i>People don't want me around their children</i>	3 (2%)
<i>I have been treated with hostility or coldness by strangers</i>	3 (2%)
<i>I have been ignored, excluded or avoided by people close to me</i>	3 (2%)
<i>I have been rejected by a potential sexual or romantic partner</i>	17 (9%)
<i>Someone acted as if I could not be trusted</i>	3 (2%)
<i>I was denied a place to live or lost a place to live</i>	1 (1%)
<i>I was treated poorly or made to feel inferior when receiving healthcare</i>	4 (2%)
<i>I was denied a job or lost a job</i>	4 (2%)
<i>Someone insulted or made fun of me</i>	5 (3%)
<i>My personal property was damaged or stolen</i>	0 (0%)
<i>I was physically assaulted or beaten</i>	0 (0%)
Stress associated with most impactful event	M: 4.8 (SD: 3.3)
Composite stress score	M: 1.5 (SD: 2.0)
Frequency, past year, most impactful event	
Almost everyday	18 (9%)
At least once a week	4 (2%)
A few times a month	8 (4%)
A few times this year	22 (11%)
About once this year	36 (18%)
Never (<i>denied any events in the past year</i>)	103 (52%)

Table 5. Comparisons of sociodemographic characteristics between groups – participants who endorsed enacted stigma in past year versus those who did not.

Characteristic	Endorsed event past year (n= 96)	Did not endorse event past year (n= 103)	Between Group Comparison (F or χ^2 p value)
Age	44.9 \pm 12.5	46.5 \pm 11.6	.353
Gender			.429
Male	62	61	
Female	33	41	
Transgender	5	4	
Race			.582
African American/Black	78	89	
White	13	12	
Hispanic or Latino	1	1	
Biracial or Multiracial	2	1	
Other	2	0	
Sexual Orientation			.462
Homosexual/Same sex loving	28	31	
Bisexual	13	9	
Heterosexual/Straight	50	62	
Education Level			.691
Less than HS degree	22	23	
HS degree or equivalent	31	39	
More than HS degree	43	41	
Employment			.791
Working full time	13	13	
Working part time	7	12	
On disability	38	41	
Unemployed	34	35	
Student	3	2	
Religion			.246
Christian	71	77	
Agnostic/Atheist	2	0	
Spiritual but not religious	12	8	
Other	11	17	
Ever incarcerated	52	48	.286
In the past month:			
Unreliable transportation	18	16	.547
Unstable housing	14	9	.197
Food insufficiency	41	18	<.001*
Mental Health Counselor	13	10	.709
Substance Use Counselor	9	3	.187
HIV Support Group	11	2	.103
AA/NA Groups	18	9	.634

Table 6. Comparisons of health and medical information between groups endorsing events of enacted stigma in the past year.

Characteristic	Endorsed event past year (n= 96)	Did not endorse event past year (n= 103)	Between Group Comparison (For χ^2 p value)
Years since HIV Diagnosis	13.2 \pm 8.8	13.7 \pm 8.7	.698
CESD score	18.3 \pm 12.3	13.1 \pm 10.2	.002*
CESD cognitive/affective	9.8 \pm 6.7	6.8 \pm 5.9	.001*
AUDIT	4.7 \pm 6.5	2.7 \pm 4.0	.008*
Internalized stigma	2.7 \pm 1.2	2.1 \pm 1.0	<.001*
Visual analog med adherence	86.2 \pm 26.8	85.3 \pm 26.0	.822
# Active medications	5.2 \pm 3.5	6.0 \pm 4.1	.113
Most recent viral load			.509
Most recent CD4 count	575.4 \pm 278.4	575.4 \pm 334.4	1.00
Quality of Life Measures			
General health \geq "good"	77 (80%)	86 (83%)	.311
Health not good \geq 2 weeks	37 (39%)	26 (25%)	.098
Health kept from activities \geq 2 weeks	33 (34%)	17 (17%)	.021*
Pain \geq 2 weeks	33 (34%)	23 (22%)	.067
Clinic attendance			.589
Missed appointments	42 (44%)	49 (48%)	
Attended all	54 (56%)	54 (52%)	
Viral Load Status			.515
Detectable (\geq 20)	30 (31%)	36 (35%)	
Undetectable	64 (67%)	63 (61%)	
CD4 cell count < 200	7 (7%)	12 (12%)	.256
Comorbid treatment			
Pulmonary treatment	16 (17%)	20 (19%)	.614
Diabetes treatment	6 (6%)	12 (12%)	.184
Hepatitis C treatment	2 (2%)	0 (0%)	.141
Infection treatment	33 (34%)	41 (43%)	.428
Cardiovascular treatment	43 (45%)	54 (52%)	.282
Gastrointestinal treatment	10 (10%)	24 (23%)	.016*
Pain treatment	23 (24%)	27 (26%)	.714
Urinary/prostate treatment	2 (2%)	4 (4%)	.458
Thyroid treatment	4 (4%)	2 (2%)	.359
Psychotropic treatment	34 (35%)	32 (33%)	.515
Sleep aid	2 (2%)	5 (5%)	.289

Note: Significant group differences denoted with a *.

Table 7. Correlations between coping subscales (N=96).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Self Distraction	---													
2. Active	.395 **	---												
3. Denial	.428 **	.435 **	---											
4. Substance Use	.368 **	.198 +	.411 **	---										
5. Emotional Support	.350 **	.448 **	.411 **	.174 +	---									
6. Instrumental Support	.363 **	.425 **	.434 **	.337 *	.735 **	---								
7. Behavioral Disengagement	.263 *	.263 *	.592 **	.464 **	.301 *	.390 **	---							
8. Venting	.443 **	.419 **	.577 **	.295 *	.436 **	.540 **	.543 **	---						
9. Positive Reframe	.415 **	.529 **	.387 **	.351 **	.422 **	.348 *	.399 **	.343 *	---					
10. Planning	.489 **	.610 **	.426 **	.283 *	.616 **	.540 **	.478 **	.473 **	.662 **	---				
11. Humor	.170	.218 *	.334 *	.358 **	.250 *	.259 *	.328 *	.464 **	.261 *	.354 **	---			
12. Acceptance	.501 **	.326 *	.269 *	.202 *	.363 **	.276 *	.196 +	.410 **	.345 *	.501 **	.173 +	---		
13. Religion	.180 +	.163	.289 *	.086	.487 **	.430 **	.287 *	.362 **	.354 **	.445 **	.253 *	.427 **	---	
14. Self Blame	.343 *	.209 *	.329 *	.458 **	.248 *	.373 **	.529 **	.481 **	.235 *	.420 **	.439 **	.256 *	.244 +	---

Note: $p < .001^{**}$; $p < .05^{*}$; $p < .10^{+}$

Table 8. Principal component analysis with varimax rotation of three-factor structure of the Brief COPE (N= 96).

Subscale	1	2	3
Denial	.579	.392	.218
Substance Use	.721	.319	-.165
Behavioral Disengagement	.751	.186	.196
Venting	.580	.307	.427
Humor	.653	.011	.246
Self-Blame	.745	.115	.168
Self-Distracton	.259	.745	.022
Active Coping	.110	.738	.207
Positive Reframing	.232	.714	.205
Planning	.277	.659	.467
Acceptance	.075	.580	.328
Emotional Support	.129	.389	.754
Instrumental Support	.326	.304	.669
Religion	.141	.107	.792

Table 9. Descriptive statistics of Brief COPE subscales in response to coping with most impactful enacted stigma event in the past year (N = 96).

Brief COPE Subscale	M	SD
Denial Coping	3.97	2.09
Substance Use Coping	3.57	2.06
Behavioral Disengagement Coping	3.64	1.93
Venting Coping	4.16	2.16
Humor Coping	3.47	1.91
Self Blame Coping	4.03	2.00
Self Distraction Coping	4.58	2.14
Active Coping	4.70	2.17
Positive Reframe Coping	5.03	2.08
Planning Coping	4.55	2.06
Acceptance Coping	5.51	1.91
Emotional Support Coping	4.31	2.08
Instrumental Support Coping	4.11	2.02
Religion Coping	5.32	2.21
Coping Factors		
Maladaptive Coping composite score	3.80	1.48
Cognitive Adaptive Coping composite score	4.86	1.58
Supportive Coping composite score	4.58	1.76
Adaptive Cognitive + Supportive Coping composite score	4.75	1.49

Note: Range of subscales is 2-8.

Table 10. Correlations between sociodemographic and mental and physical health variables in full sample (N=199).

	CESD	AUDIT	Internalized Stigma	Enacted Stigma	Clinic Attendance	Total # medications	VAS Adherence	VL>20	CD4 <200
Age	-.064	-.059	-.207*	-.025	-.178*	.462**	.143 ⁺	-.151*	.061
Gender	.135 ⁺	-.089	.075	-.015	.151*	.168*	.027	-.095	.035
Sexual minority	-.036	.033	-.106	-.160*	-.218*	-.046	-.001	.174*	-.112
Education	-.111	-.083	-.018	-.126 ⁺	.025	-.144*	-.036	.103	-.083
Working	-.232*	-.051	-.019	-.144*	.067	-.246**	-.064	.125	-.105
Stable Housing	.202*	.208*	.131 ⁺	.065	.075	-.038	-.040	.119	.044
Food insecurity	.308**	.152*	.168*	.162*	.060	.006	-.055	.012	.051
Years since HIV diagnosis	-.089	-.087	-.210*	-.019	-.140	.354**	.076	-.095	.004
CESD	---	.201*	.433**	.359**	.035	.154*	-.123 ⁺	-.024	.067
AUDIT	---	---	.209*	.133	.074	.029	-.062	.183*	.048
Internalized HIV stigma	---	---	---	.372**	-.026	-.142*	-.127 ⁺	.078	.107
Enacted HIV Stigma	---	---	---	---	-.001	-.083	-.130 ⁺	-.089	.002
Clinic Attendance	---	---	---	---	---	-.027	-.101	.101	.023
Total # medications	---	---	---	---	---	---	-.032	-.055	.126*
VAS Adherence	---	---	---	---	---	---	---	-.321**	-.024
Viral load>20	---	---	---	---	---	---	---	---	.246*

Note: p<.001**; p<.05*; p<.10⁺

Table 11. Correlations between sociodemographic variables and outcome variables in path model (N=96).

	Stress	Maladaptive Coping	Adaptive Coping	Clinic Attendance	Total # medications	Med Adherence (VAS>85%)	Viral Load Status (VL>20)	CD4 (<200)
Age	-.095	-.067	-.043	-.163	.443**	.049	-.037	.140
Gender	.024	.055	.038	.063	.253*	.030	-.223	.044
Racial minority	.107	.099	.111	-.011	-.076	-.076	-.056	-.004
Sexual minority	-.049	-.115	-.069	-.179 ⁺	-.129	.024	.263*	-.096
Education	-.019	.017	-.037	.042	-.120	-.010	.075	-.228*
Working	-.209*	-.277*	-.098	-.015	-.323*	.009	.161	-.157
Stable Housing	.022	.169	.161	.103	-.038	.076	.255*	.121
Years since HIV diagnosis	-.068	-.142	.001	-.102	.381**	-.029	-.076	.105
CESD	.395**	.429**	.172	.001	.214*	.009	-.009	.106
AUDIT	.092	.282*	.166	.144	.020	-.091	.175 ⁺	.085
Internalized HIV stigma	.366**	.473**	.242*	-.036	.002	-.094	.047	.226*
Enacted HIV Stigma	.368**	.414**	.192 ⁺	.023	-.058	-.111	-.106	.072
Stress	---	---	---	---	---	---	---	---
Maladaptive Coping	.311**	---	---	---	---	---	---	---
Adaptive Coping	.246*	.619**	---	---	---	---	---	---
Clinic Attendance	.062	-.118	-.080	---	---	---	---	---
Total # medications	.094	.149	.037	-.148	---	---	---	---
Med adherence	-.024	-.140	-.097	-.020	-.028	---	---	---
Viral load>20	.071	-.093	-.096	-.050	-.044	-.300*	---	---
CD4<200	.140	.063	-.013	-.168	.272*	.058	.240*	---

Note: p<.001**; p<.05*; p<.10⁺

Table 12. Associations between model mechanisms and HIV-related health outcomes.

	Stress	Maladaptive Coping	Adaptive Coping	Number Meds	Clinic Attendance	VAS<85%	Viral Load Status	CD4<200
Internalized HIV Stigma	$B(SE)=0.92$ (0.26) $\beta=0.35$ $p=.001$	$B(SE)=0.55$ (0.11) $\beta=0.45$ $p<.001$	$B(SE)=0.29$ (0.12) $\beta=0.24$ $p=.02$	$B(SE)=0.12$ (0.27) $\beta=0.04$ $p=.66$	OR=0.96 (0.68-1.31) $p=.72$	OR=0.84 (0.57-1.23) $p=.36$	OR=1.00 (0.66-1.54) $p=.98$	OR=2.15 (1.04-4.46) $p=.04$
Stress	---	$B(SE)=0.13$ (0.05) $\beta=0.27$ $p=.01$	$B(SE)=0.12$ (0.05) $\beta=0.25$ $p=.02$	$B(SE)=0.09$ (0.10) $\beta=0.09$ $p=.36$	OR=0.69 (0.91-1.18) $p=.56$	OR=0.98 (0.85-1.14) $p=.83$	OR=1.09 (0.93-1.28) $p=.31$	OR=1.19 (0.92-1.54) $p=.20$
Maladaptive Coping	---	---	---	$B(SE)=0.33$ (0.23) $\beta=0.14$ $p=.14$	OR=0.85 (0.64-1.13) $p=.25$	OR=0.81 (0.59-1.11) $p=.18$	OR=0.83 (0.56-1.22) $p=.34$	OR=1.21 (0.73-1.99) $p=.46$
Adaptive Coping	---	---	---	$B(SE)=0.04$ (0.21) $\beta=0.02$ $p=.87$	OR=0.90 (0.68-1.18) $p=.44$	OR=0.86 (0.63-1.18) $p=.35$	OR=0.82 (0.58-1.17) $p=.27$	OR=0.94 (0.55-1.60) $p=.83$

Note: standardized betas and regression coefficients with standard errors presented for linear regressions. Odds ratios and confidence intervals presented for logistic regressions.

Table 13. Regression analyses among study variables predicting health outcome (VAS<85%).

	Consequent											
		M ₁ (Stress)				M ₂ (Maladaptive Coping)				Y (VAS<85%)		
Antecedent		B	SE	p		B	SE	p		B	SE	p
X (Internalized Stigma)	a	.917	.263	<.001	b	.571	.114	<.001	c'	-.175	.254	.492
M ₁		---	---	---		---	---	---	d ₁	.119	.273	.663
M ₂		---	---	---		---	---	---	d ₂	-.003	.673	.996
V (Adaptive Coping)		---	---	---		---	---	---	e ₁	.176	.477	.713
M ₁ x V		---	---	---		---	---	---	e ₂	-.018	.051	.729
Constant	i _{M1}	2.651	0.840	.002	i _{M2}	2.407	0.364	<.001	i _Y	1.245	2.218	.575
		R ² =.413				R ² =.282						
		F(2, 83)=8.509, p<.001				F(2, 83)=16.310, p<.001						

Note: Employment status was included as covariate.

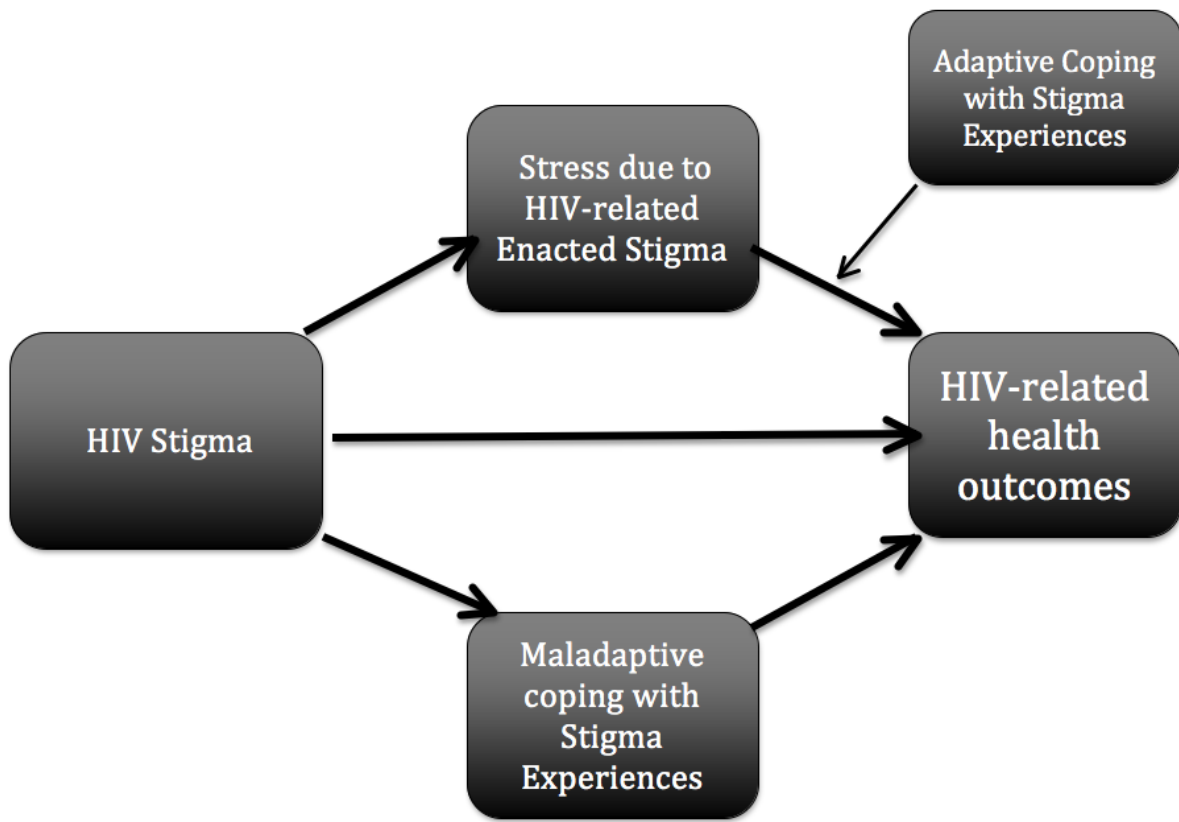


Figure 1. Conceptual model adapted for current study to investigate the relationships between HIV stigma and HIV health outcome mediated by perceived stress and maladaptive coping strategies, with potential buffering effects of adaptive coping resources.

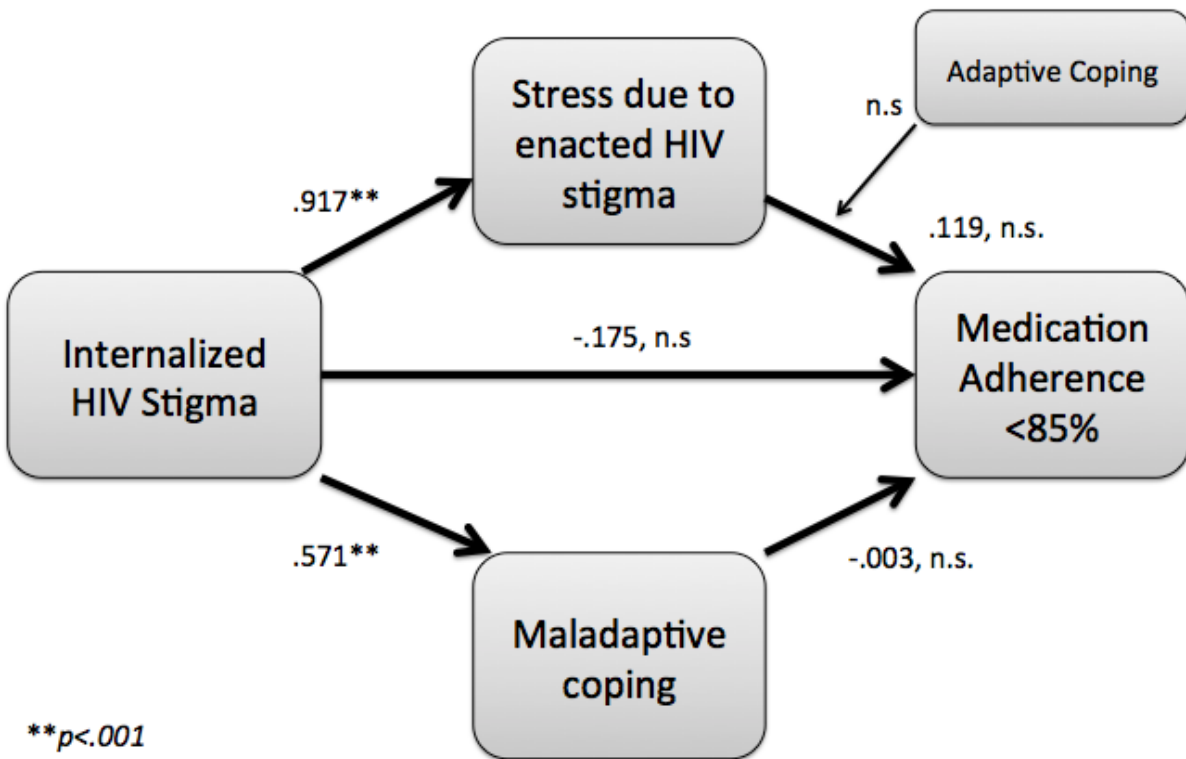


Figure 2. Conceptual model tested in current study showing significant association between internalized HIV stigma and stress related to most impactful enacted stigma event in the past year, as well as maladaptive coping approaches in response to most impactful enacted stigma event. Employment status was included as a covariate in analysis.